

'Sundried tide' -- silent, natural disaster

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Australian researchers have studied and documented the effect of the "sundried tide", a force of nature that can silently wipe out coral reefs.

Their analyses have revealed for the first time that these are highly predictable events that can seriously impact the state of coral reefs at a time when they are preparing for the stresses of summer.

In a paper published in scientific journal *Marine Biology*, Dr Ken Anthony and Dr Ailsa Kerswell, of the ARC Centre of Excellence for Coral Reef Studies (CoECRS) at The University of Queensland (UQ) and James Cook University (JCU) have revealed that extreme low tides on clear sunny days can lead to widespread damage of coastal coral colonies.

"Really low tides, where the local sea level gets to its extreme low for the year, can occur at different times of the day," UQ's Dr Anthony said.

"In years where this occurs during the middle of the day when the sunlight is at its most intense and the reefs are almost fully exposed, there is a real risk of severe coral stress and death in the shallow reef zone."

Just like cyclones and other natural disasters, these severe 'sun-dry tides' rarely occurred since they relied on the alignment of numerous natural extremes, he said.

However, when these factors all aligned, by a combination of sun, moon

and chance weather, an extreme event occurred which could leave coral colonies bleached and devastated.

One such event occurred in September 2005 while Dr Anthony and Dr Kerswell were taking JCU students on a field trip to Orpheus Island off the Queensland coast.

“While doing some field work we noticed that all the corals in the area were about to die, so we took the opportunity to record the event,” Dr Kerswell said.

Their observations led Dr Anthony and Dr Kerswell to investigate the mysterious coral deaths on Orpheus Island — a study which would reveal that what they had witnessed was a rare event, the extent of which had never previously been recorded on the Great Barrier Reef .

“At first we thought it was a major outbreak of disease,” Dr Kerswell said.

"We collected samples and took hundreds of photos and sent a series off to colleagues to be analysed. The response was that it was not a disease, but something else.

“[So] we looked back through hourly records of tidal patterns over the previous eight years and combined it with data on solar records and models.”

Dr Anthony said the researchers aligned what the tide would do with the sun and weather patterns and ran an analysis of the risk of corals being out of the water and exposed to the sun.

During September 2005 Dr Anthony, Dr Kerswell and the students were present the week following a rare extremely low tide during which the

sun had been shining from a clear sky.

These "natural disasters" occur silently but can devastate the tidal zone. From past records Dr Anthony estimated that the September 2005 event was the worst in the eight-year record.

However, the "sundried tides" could also be anticipated.

"These events are highly predictable," Dr Anthony said.

"We can go into the weather reports, align them with tidal charts and predict the times of greatest risk.

"The high-risk time of year is July–October, when corals are building up resources for spawning and preparing for summer stressors such as thermal bleaching."

Since studying the cause and impacts of these major events, Dr Anthony hopes that their predictable nature will lead to improved warning systems and better models for predicting stress and mortality in corals.

Although predictable and natural, "sundried tides" were unavoidable and compounded the stresses already felt by corals due to climate change and human impacts, he said.

"However, if we better understand the timing and severity of natural stressors on reefs, we will be able to better predict the risks of human-induced stressors, and hopefully better manage for healthy reefs," he said.

Source: James Cook University

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